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U S APPLICATION NO (If known, see 37 C F R 15)

UNKNOWN 09/890634

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP00/00635	FEBRUARY 4, 2000	FEBRUARY 15, 1999

TITLE OF INVENTION

IMAGE PROCESSING DEVICE

APPLICANT(S) FOR DO/EO/US

ONISHI, HIROAKI; FUJIMOTO, HISAYOSHI

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).
4. A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. has been transmitted by the International Bureau.
 - c. is not required, as the application was filed in the United States Receiving Office (RO/US)
6. A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. have been transmitted by the International Bureau.
 - c. have not been made; however, the time limit for making such amendments has NOT expired.
 - d. have not been made and will not be made.

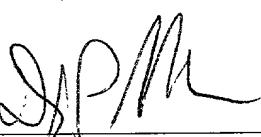
8. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).

10. A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. An Information Disclosure Statement under 37 CFR 1.97 and 1.98, form 1449, 3 references.
12. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. A **FIRST** preliminary amendment.
14. A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. A substitute specification.
16. Other items or information: PCT/IB/304, PCT/IB/308, PCT/IB/332, PCT/ISA/210, PCT/IPEA/409, Preliminary Amendment, Amended Claims under PCT Article 34, Front Page of PCT/JP00/00635, Certification of Translation of the same

U.S. APPLICATION NO (If known, see 37 C F R 15) UNKNOWN 09/890634	INTERNATIONAL APPLICATION NO PCT/JP00/00635	ATTORNEY'S DOCKET NUMBER 10921.100USWO		
17. [X] The following fees are submitted:		CALCULATIONS PTO USE ONLY		
BASIC NATIONAL FEE (37 CFR 1.492(a) (1)-(5)):				
Search Report has been prepared by the EPO or JPO.....\$860.00				
International preliminary examination fee paid to USPTO (37 CFR 1.492(a)(1)).....\$690.00				
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)).....\$710.00				
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(3)) paid to USPTO\$1000.00				
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)\$100.00				
ENTER APPROPRIATE BASIC FEE AMOUNT =		\$860.00		
Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		\$0		
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	12	-20 = 0	X \$18.00	\$0
Independent claims	1	-3 = 0	X \$80.00	\$0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	\$0
TOTAL OF ABOVE CALCULATIONS =		\$860.00		
Reduction by 1/2 for filing by small entity, if applicable. Small entity status is claimed pursuant to 37 CFR 1.27		\$0		
SUBTOTAL =		\$860.00		
Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		+ \$0		
TOTAL NATIONAL FEE =		\$860.00		
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property		+ \$40.00		
TOTAL FEES ENCLOSED =		\$900.00		
		Amount to be: refunded	\$0	
		charged	\$0	
a. [X] Check(s) in the amount of \$860.00 and \$40.00 to cover the above fees is enclosed.				
b. [] Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.				
c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>13-2725</u> .				
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.				
SEND ALL CORRESPONDENCE TO Douglas P. Mueller MERCHANT & GOULD P.O. Box 2903 Minneapolis, MN 55402-0903		SIGNATURE:  NAME: Douglas P. Mueller		
REGISTRATION NUMBER: 30,300				

S/N unknown

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

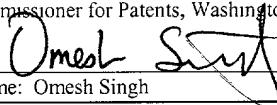
Applicant:	Onishi, et al.	Docket No.:	10921.100USWO
Serial No.:	unknown	Filed:	concurrent herewith
Int'l Appln No.:	PCT/JP00/00635	Int'l Filing Date:	February 4, 2000
Title:	IMAGE PROCESSING DEVICE		

CERTIFICATE UNDER 37 CFR 1.10

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I hereby certify that this paper or fee is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 and is addressed to the Commissioner for Patents, Washington, D.C. 20231.

By 
Name: Omesh SinghPRELIMINARY AMENDMENT

Box PCT
 Assistant Commissioner for Patents
 Washington, D. C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment, which is based on the Article 34 amendments, based on claims amended in prosecution of the international application and published in the International Preliminary Examination Report, a copy of which is enclosed herewith:

IN THE ABSTRACT

Insert the attached Abstract page into the application as the last page thereof.

IN THE SPECIFICATION

A courtesy copy of the present specification is enclosed herewith. However, the World Intellectual Property Office (WIPO) copy should be relied upon if it is already in the U.S. Patent Office.

REMARKS

A new abstract page is supplied to conform to that appearing on the publication page of the WIPO application, but the new Abstract is typed on a separate page as required by U.S. practice. Applicants confirm that the Article 34 Amendment from the international stage should be entered for examination. A translation is provided herewith.

Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 371.5237.

Respectfully submitted,

MERCHANT & GOULD P.C.
Post Office Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300

By 
Douglas P. Mueller
Reg. No. 30,300

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DPM/rw



DESCRIPTION

IMAGE PROCESSING DEVICE5 TECHNICAL FIELD

The present invention relates to an image processing device, more particularly to an image processing device that comprises an original-document platen roller that is for transporting an original document, and a recording-paper platen roller that is for transporting recording paper.

BACKGROUND ART

An image processing device that is capable of performing image-read processing and image-print processing, such as a facsimile device, for example, typically comprises two types of platen roller. One such platen roller is an original-document platen roller that is for transporting an original document that has an image to be read, and that is actuated when image-read processing takes place. The other platen roller is a recording-paper platen roller that is for transporting recording paper which is to be subjected to print-processing, and that is actuated when image-print processing takes place. The use of separate drive sources for the rotation of each of these two platen rollers is unfavorable on account of the high costs involved. Consequently, some conventional image processing devices, as shown in Fig. 7, are constructed such that two platen rollers

are rotated through the use of one drive source.

The conventional image processing device shown in Fig. 7 comprises an image-read head 80, an original-document platen roller P_1 that is provided facing this image-read head 80, a print head 81, a recording-paper platen roller P_2 that is provided facing this print head 81, and a drive mechanism 7 for drive-rotating the two platen rollers P_1 , P_2 .

The drive mechanism 7 comprises a single motor M1, a driving gear 84 provided on the drive shaft of motor M1, a large-diameter gear 85, two movable gears 71, 72, and intermediate gears Ga to Gf. The large-diameter gear 85 is caused to rotate by driving gear 84. The two movable gears 71, 72 are driven by engagement with large-diameter gear 85. Since displacement of movable gears 71, 72 is required, in addition to rotation of same, these can be displaced, in the circumferential direction of large-diameter gear 85 as respectively shown by arrows Na, Nb, by the movement of a mechanism beyond the view of the figure in which another motor (not shown) constitutes a drive source.

According to a constitution of this kind, engagement of movable gear 71 with intermediate gear Ga enables original-document platen roller P_1 to rotate via intermediate gear Gb, and original document D is thereby transported. Meanwhile, engagement of movable gear 72 with intermediate gear Gc enables recording-paper platen roller P_2 to rotate via intermediate gears Gc to Gf, and recording paper K is thereby transported. At the same time as movable gear 71

engages with intermediate gear Ga, movable gear 72 engages with intermediate gear Gc, and simultaneous rotation of original-document platen roller P_1 and recording-paper platen roller P_2 is possible. With regard thereto, when either
5 one of movable gear 71 and movable gear 72 is moved away from either intermediate gear Ga or intermediate gear Gc, as shown by the virtual displacement lines in Fig. 7, either one of original-document platen roller P_1 and recording-paper platen roller P_2 can be rotated independently of the other. It thus
10 becomes possible to perform read-processing of the image of original document D, and image-print processing on recording paper K, separately or simultaneously.

However, the conventional image processing device must also comprise a mechanism (not shown) for displacing movable gears 71, 72 as described above. Furthermore, in order to drive this mechanism, another motor (not shown) must be provided in addition to motor M1. In addition, since, in a conventional image processing device, an image-read head 80 and print head 81 are provided separately, an original-
15 document print head and recording-paper print head, that are correspondingly provided, are arranged separately from another. As a result, in order to transmit the rotational force of the two movable gears 71, 72 to original-document platen roller P_1 and recording-paper platen roller P_2 , respectively, it is necessary to respectively provide
20 individual intermediate gear paths Ga to Gb and Gc to Gf.
25

As described above, conventionally, in order to realize selective drive of original-document platen roller P_1 and recording-paper platen roller P_2 by means of movable gears 71, 72, a plurality of mechanisms have been required for the 5 device and, as a result, a multiplicity of gears. However, this has resulted in a cumbersome overall constitution of the device and high manufacturing costs.

DISCLOSURE OF THE INVENTION

10 It is therefore an object of the present invention to simplify the construction of the mechanism for rotating the original-document platen roller P_1 and recording-paper platen roller P_2 and thus reduce manufacturing costs thereof.

An image processing device is provided according to a 15 first aspect of the present invention. This image processing device comprises an original-document platen roller that has a first driven gear and is for transporting an original document, a recording-paper platen roller that has a second driven gear and is for transporting recording paper, and a 20 drive mechanism that has a first movable gear, a second movable gear, and a drive source and is for transmitting a drive force generated by this drive source to the first driven gear and second driven gear, characterized in that the first movable gear is provided so as to be capable of engaging 25 directly with the first driven gear, and the second movable gear is provided so as to be capable of engaging directly with the second driven gear.

In the present invention, the two movable gears of the drive mechanism are provided so as to be capable of engaging directly with the original-document platen roller and recording-paper platen roller, not as intermediate gears of 5 the drive mechanism but as distal gears thereof. According to such a constitution, the motive power transmission path of the drive mechanism is not obstructed at any point therealong due to the displacement of the two movable gears, meaning that a mechanism that permits displacement of the two 10 movable gears can be constructed inside the drive mechanism in such a manner that substantially the entire capacity of the drive mechanism is utilized. In other words, in order to achieve the transmission of motive power to the two platen rollers and displacement of the two movable gears, a common 15 motor, gears and other components can be utilized. Further, since the first movable gear and second movable gear are provided so as to be capable of engaging directly with the original-document platen roller and recording-paper platen roller respectively, it is not necessary to provide a 20 multiplicity of gears therebetween as has been the case conventionally. The overall construction of the device is therefore simple and the total number of gears required by the device is small, which in turn permits a reduction in the manufacturing costs thereof.

25 A preferred embodiment of the present invention further comprises an image read/write integrated head in which a plurality of photoreceptors for reading an original-document

image, and a plurality of printing elements for performing image printing are mounted on the same side of the same base plate. The original-document platen roller is provided facing the plurality of photoreceptors, and the recording-paper 5 platen roller is provided facing the plurality of printing elements. With a constitution of this kind, the original-document platen roller and recording-paper platen roller can be provided close to one another. Consequently, due to the narrowing of the interval between the two movable gears of 10 the drive mechanism, miniaturization of the drive mechanism itself and simplification of the construction thereof are possible.

The drive mechanism preferably comprises a switching mechanism that selectively causes the first movable gear and 15 the second movable gear to engage with the first driven gear and the second driven gear, respectively. With a constitution of this kind it becomes possible to selectively perform rotation of the original-document platen roller and recording-paper platen roller.

20 The switching mechanism preferably permits a mode in which the first movable gear is caused to engage with the first driven gear, and the second movable gear is simultaneously moved away from the second driven gear. With a constitution of this kind it becomes possible for the image processing 25 device of the present invention to selectively perform only read-processing of an original-document image.

The switching mechanism preferably also permits a mode in which the second movable gear is caused to engage with the second driven gear, and the first movable gear is simultaneously moved away from the first driven gear. With 5 a constitution of this kind it becomes possible for the image processing device of the present invention to selectively perform only print-processing on the recording paper.

The switching mechanism preferably also permits a mode in which the first movable gear is caused to engage with the 10 first driven gear, and the second movable gear is simultaneously caused to engage with the second driven gear. With a constitution of this kind it becomes possible for the image processing device of the present invention to simultaneously perform read-processing of an original- 15 document image and print-processing on the recording paper.

The switching mechanism preferably comprises a cam that has a cam gear for receiving drive force from the drive source; a first arm that is provided so as to be capable of coming into contact with the cam and on which the first movable gear 20 is mounted; a second arm that is provided so as to be capable of coming into contact with the cam and on which the second movable gear is mounted. The cam establishes the position of the first movable gear and second movable gear through contact with the first arm and the second arm. With a constitution 25 of this kind, by causing the cam to rotate, it is possible to change the position of the first movable gear and second movable gear via the first arm and the second arm,

respectively.

The first arm is preferably capable of swinging about an axis formed by a shaft portion, and has a first end portion, on which the first movable gear is provided, and a second end portion that is capable of coming into contact with the cam.

The second arm is preferably capable of swinging about an axis formed by a shaft portion, and has a first end portion, on which the second movable gear is provided, and a second end portion that is capable of coming into contact with the cam.

The second end portion of the second arm preferably remains in continual contact with the cam by means of spring bias.

The drive source is preferably a motor that has a drive shaft capable of forward and reverse rotation, and the switching mechanism causes the cam to rotate, without transmitting drive force of the motor to the cam gear during forward rotation of the drive shaft, or transmitting the drive force to the cam gear during reverse rotation of the drive shaft. With a constitution of this kind, it is possible for a single, rotating motor to perform not only the rotational movement of the original-document platen roller and recording-paper platen roller, but also movement to change the position of the two movable gears by means of a rotational movement by the cam. This obviates the need to further provide a dedicated motor for changing the position of the two movable gears, and the overall construction of the image processing

device is thereby simplified.

The first arm is preferably capable of swinging about an axis formed by a shaft portion, and has a first end portion, on which the first movable gear is provided, and a second end portion that is capable of coming into contact with the cam, and, during reverse rotation of the drive shaft, contact, between the second end portion of the first arm, and the cam, is broken, the first movable gear swings until a position is established in which the first movable gear engages with the cam gear, and the drive force is transmitted to the cam gear. With a constitution of this kind, there is no requirement to especially provide any special device for the transmission of rotational force to the cam or for the halting of rotational force transmission thereto since the first movable gear can be utilized for these purposes.

According to a second aspect of the present invention, another image processing device is provided. This image processing device comprises an original-document platen roller, a recording-paper platen roller, and a drive mechanism, that has a motor, for transmitting the drive force generated by this motor to the original-document platen roller and recording-paper platen roller. This drive mechanism has a first movable gear that is capable of being displaced between a drive position in which the original-document platen roller is driven and a no-drive position in which the original-document platen roller is not driven, and a second movable gear that is capable of being displaced

between a drive position in which the recording-paper platen roller is driven and a no-drive position in which the recording-paper platen roller is not driven. Further, the drive mechanism has a switching mechanism that maintains each 5 of the movable gears in the drive positions or the no-drive positions during forward rotation of the motor, or selectively displaces the two movable gears, by means of the motor drive force, between the drive positions and the no-drive positions during reverse rotation of the motor.

10 According to the present invention, a single motor generates drive force for the rotation of the original-document platen roller and recording-paper platen roller, and for changing the position of the two gears. As a result, the image processing device of the present invention does not need 15 to comprise individual motors for such movements, and the manufacturing costs thereof can thus be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic cross-sectional view showing an 20 example of the image processing device relating to the present invention.

Fig. 2 is a cross-sectional view, with major parts enlarged, of the image processing device shown in Fig. 1.

Fig. 3 is a side view showing the drive mechanism of 25 the image processing device shown in Fig. 1.

Fig. 4 is a side view illustrating movement of the drive mechanism shown in Fig. 3.

Fig. 5 is a side view illustrating further movement of the drive mechanism shown in Fig. 3.

Fig. 6 is a side view illustrating further movement of the drive mechanism shown in Fig. 3.

5 Fig. 7 is a schematic cross-sectional view showing an example of a conventional image processing device.

BEST MODE FOR CARRYING OUT THE INVENTION

A preferred embodiment of the present invention will
10 be explained in concrete terms hereinbelow with reference to
the attached figures.

As shown in Fig. 1, in a preferred embodiment of the present invention, image processing device A is constituted as a facsimile device. This image processing device A
15 comprises a case unit 1 made from a synthetic resin, an image read/write integrated head B, an original-document platen roller P_1 for transporting an original document D, a recording-paper platen roller P_2 , for transporting recording paper K, and a drive mechanism 2 for driving these two platen
20 rollers.

An original-document insert opening 10 and paper eject opening 11 are formed in the case unit 1. Original document D is inserted in the case unit 1 from the original-document insert opening 10 and guided by a guide plate 12 so as to be
25 interposed between the image read/write integrated head B and the original-document platen roller P_1 . The original document, which is guided in this manner, is transported

towards paper eject opening 11 by means of the rotation of original-document platen roller P_1 , and ejected from case unit 1. Meanwhile, a space is provided, inside case unit 1, for housing winding roll R, whereon recording paper K is wound.

5 Recording paper K, which is unwound from this winding roll R, is supplied in such a manner as to be interposed between image read/write integrated head B and recording-paper platen roller P_2 . Recording paper K, which is thus supplied, is transported towards paper eject opening 11 by means of the 10 rotation of recording-paper platen roller P_2 , and ejected from case unit 1. Paper eject opening 11 may serve as an eject opening for both original document D and recording paper K.

Since this image processing device A is a so-called wall-type facsimile device, during use, bottom 1a of case unit 15 1 is mounted on a wall such that same faces the surface of a vertical wall. Furthermore, in Fig. 1, original-document insert opening 10 of image processing device A is situated in the left end of case unit 1. However, when this image processing device A is to be disposed on the surface of a wall, 20 original-document insert opening 10 is situated in the top of case unit 1.

Meanwhile, image read/write integrated head B functions as a read head that is capable of read-processing of an image on original document D and functions as a thermal 25 print head that is capable of image-print processing on recording paper K. As shown in Fig. 2, image read/write integrated head B comprises a base plate 31 and a case 30 that

is provided thereon. In Fig. 2, the direction lengthwise along original-document platen roller P_1 and recording-paper platen roller P_2 , is the main scanning direction.

The rear surface 31a (upper surface) of base plate 31 has a plurality of drive ICs 35 mounted thereon for controlling a plurality of light sources 32, a plurality of photoreceptors 33, and a plurality of heating elements 34 that constitute printing elements. The plurality of light sources 32 and plurality of drive ICs 35 are each arranged at suitable intervals in a row shape that extends in the main scanning direction. The plurality of photoreceptors 33 and plurality of heating elements 34 are correspondingly each arranged in close formation in a row shape that extends in the main scanning direction. A plurality of LEDs may be used, for example, as the plurality of light sources 32. However, another kind of light source may also be employed for light sources 32. The plurality of photoreceptors 33 have a photoelectric pickup function and output image signals for an output level that varies in accordance with the amount of light received. The plurality of heating elements 34 are the same kind of heating elements used in a typical thermal print head. Each of a plurality of drive ICs 35 is used to control the plurality of heating elements 34 for each individual dot. By means of this control, the plurality of heating elements 34 generate heat under the control for each individual dot. In the present embodiment, the plurality of heating elements 34 and plurality of drive ICs 35 are separately provided on

base plate 31, however, in another embodiment, same may be formed integrally and provided on base plate 31. A radiation plate 36 is provided on the rear face of base plate 31.

Case 30 is provided on base plate 31 so as to cover the plurality of light sources 32, plurality of photoreceptors 33 and plurality of drive ICs 35, but not the plurality of heating elements 34. Case 30 comprises, on the upper face thereof, a transparent plate 37 that is light-transmissive, and original-document platen roller P_1 is provided facing the surface of this transparent plate 37. Meanwhile, recording-paper platen roller P_2 is provided facing the plurality of heating elements 34 that are in a row shape and exposed on base plate 31. Original-document platen roller P_1 and recording-paper platen roller P_2 have shaft portions 42a, 42b respectively provided at both ends of each of these respective platen rollers. These shaft portions 42a, 42b are supported by members (not shown) that are fixed with respect to case unit 1. Consequently, original-document platen roller P_1 and recording-paper platen roller P_2 can rotate in a set position. Driven gear G_1 and G_2 are respectively mounted on shaft portions 42a, 42b, and, as described above, these driven gears respectively serve to transmit the rotational force from drive mechanism 2 to original-document platen roller P_1 and recording-paper platen roller P_2 .

A light path, used for illumination, 38 is formed inside case 30. The light generated by the plurality of light sources 32 passes along within this illumination light path 38 and

irradiates transparent plate 37 and original document D, which has been supplied onto transparent plate 37 by original-document platen roller P_1 . A lens array 39 is provided inside case 30. This lens array 39 focuses the light 5 reflected from original document D, which has been supplied onto transparent plate 37, and permits the formation of an image on photoreceptors 33. Due to the fact that lens array 39 comprises multiple image lenses, which are juxtaposed in the main scanning direction, an image representing one line 10 of original document D, in the main scanning direction, is formed on the plurality of photoreceptors 33. Further, when the plurality of photoreceptors 33 receive the light focused by the lens array 39, same output image signals for an output level that varies in accordance with the amount of light 15 received. The plurality of photoreceptors 33, along with drive ICs 35, is covered by a black light shielding member, which is provided inside case 30. As a result, light from outside case 30 and, in addition, an excessive incidence of scattered light on the plurality of photoreceptors, can be 20 prevented.

Referring to Fig. 3, drive mechanism 2 comprises a motor M, a first movable gear a_1 , a second movable gear a_2 , a driving gear b_1 , a plurality of intermediate gears b_2 to b_7 , a cam 20, a first arm 22, and a second arm 24.

25 First movable gear a_1 is constituted so as to be capable of engaging directly with driven gear G_1 of original-document platen roller P_1 , and second movable gear a_2 is constituted

so as to be capable of engaging directly with driven gear G_2 of recording-paper platen roller P_2 . As a result, original-document platen roller P_1 and recording-paper platen roller P_2 are caused to rotate directly by first movable gear a_1 and second movable gear a_2 , respectively.

Motor M is one example of a drive source according to the present invention, and has a drive shaft 21 that is capable of rotating in either direction. When drive shaft 21 rotates as shown by the arrow N4, the rotational force thereof is transmitted, via an intermediate gear b_2 , from driving gear b_1 , which is mounted on this drive shaft 21, to an intermediate gear b_3 , and in turn, an intermediate gear b_4 , which is provided so as to be integral with intermediate gear b_3 , rotates. The rotational force of intermediate gear b_4 is continually transmitted to first movable gear a_1 via an intermediate gear b_5 , and transmitted to second movable gear a_2 via intermediate gears b_6 , b_7 . Consequently, when drive shaft 21 rotates as shown by the arrow N4, first movable gear a_1 and second movable gear a_2 continually rotate.

First movable gear a_1 is supported by one end of a first arm 22 that is capable of swinging, as shown by the arrow N1, about a fixed shaft 23 which also serves as the axis of intermediate gear b_5 . Since first arm 22 is provided so as to be capable of swinging, first movable gear a_1 is capable of moving to a position in which same comes into contact with and engages with driven gear G_1 of original-document platen roller P_1 , as shown in Figs. 3 and 5, or to a position in which

first movable gear a_1 is moved away from driven gear G_1 , as shown in Figs. 4 and 6.

The second movable gear a_2 is supported by one end of a second arm 24 that is capable of swinging, as shown by the 5 arrow N2, about the fixed shaft 25 which also serves as the axis of an intermediate gear b_7 . Since second arm 24 is provided so as to perform a swinging movement, second movable gear a_2 is capable of moving to a position in which same comes into contact with and engages with driven gear G_2 of 10 recording-paper platen roller P_2 , as shown in Figs. 4 and 5, or to a position in which second movable gear a_2 is moved away from driven gear G_2 , as shown in Figs. 3 and 6. The number 15 of gears between intermediate gear b_4 and second movable gear a_2 is different from the number of gears between intermediate gear b_4 and first movable gear a_1 . This difference exists in the present embodiment due to the requirement for first movable gear a_1 and second movable gear a_2 to rotate in mutually opposite directions, since original-document platen roller P_1 and recording-paper platen roller P_2 are caused to rotate 20 in mutually opposite directions.

Cam 20 is a member for changing the position of first movable gear a_1 and second movable gear a_2 by establishing positions for first arm 22 and second arm 24. Cam 20 is provided so as to rotate with a rotatable gear 27 about an axis formed 25 by fixed shaft 26. Gear 27 is provided on fixed shaft 26, which is common to gear 27 and an intermediate gear b_6 , but so as to be separate from intermediate gear b_6 . Intermediate gear

27 is thus capable of rotation about fixed shaft 26, along with cam 20 and independently of intermediate gear b_6 . More specifically, as shown in Fig. 6, first arm 22 swings about fixed shaft 23, and gear 27 rotates only when rotational force 5 is transmitted by first movable gear a_1 , which is provided on one end of arm 22, to gear 27 through engagement therewith. Further, cam 20 rotates along with the rotational movement of this gear 27. Cam 20 is formed substantially in the shape of a fan, for example, and has an end face and a face on both 10 sides. These faces are intended to constitute cam faces which come into contact with the other end of each of first arm 22 and second arm 24. As shown in Figs. 3 through 5, when intermediate gear b_4 rotates clockwise, intermediate gear b_5 rotates counterclockwise; the other end of first arm 22 thus 15 turns counterclockwise about an axis formed by fixed shaft 23, in the same way as intermediate gear b_5 , so as to come into contact with cam 20. Correspondingly, as shown in Fig. 6, when intermediate gear b_4 rotates counterclockwise, intermediate gear b_5 rotates clockwise; the other end of first 20 arm 22 thus turns clockwise about an axis formed by fixed shaft 23 so as to move away from cam 20. First movable gear a_1 then approaches and engages with gear 27. Meanwhile, second arm 24 is biased, as shown by arrow N3 in Fig. 3, by an elastic member such as a spring, such that the other end of second 25 arm 24 remains in continual contact with cam 20.

When image processing device A is to perform only read-processing of an image on original document D, an

attitude is established for cam 20 of drive mechanism 2, as shown in Fig. 3. Control of the attitude of cam 20 will be discussed hereinbelow. Drive shaft 21 of motor M is caused to rotate as shown by arrow N4. In the present embodiment,

5 arrow N4 indicates forward rotation of drive shaft 21.

When drive shaft 21 of motor M rotates forwards, intermediate gear b_5 rotates counterclockwise as a result. At the same time, first arm 22 also rotates counterclockwise about an axis formed by fixed shaft 23 until the other end 10 of first arm 22 comes into contact with one side face of cam 20. By establishing a position, for the other end of first arm 22, at which same comes into contact with one side face of cam 20, first movable gear a_1 , which is provided at one end of first arm 22, is disposed in a position at which 15 engagement with driven gear G_1 takes place. First movable gear a_1 , which is then rotating clockwise, then transmits rotational force to driven gear G_1 . As a result, the original-document platen roller rotates counterclockwise, thereby transporting original document D in a predetermined 20 direction. Thereupon, as shown in Fig. 2, light sources 32, lens array 39, and the plurality of photoreceptors 33, of image read/write integrated head B, are utilized, and read-processing of an image on original document D is thus achieved. Meanwhile, as shown in Fig. 3, in this read- 25 processing of an image on original document D, the attitude of second arm 24 is also controlled by cam 20 such that second movable gear a_2 , which is provided at one end of second arm

24, is disposed in a position at which engagement with driven gear G_2 does not take place. Consequently, contact of recording-paper platen roller P_2 with drive mechanism 2 is broken, meaning that recording-paper platen roller P_2 does 5 not rotate during image read-processing.

When image processing device A is to perform only print-processing on recording paper K, an attitude is established for cam 20 of drive mechanism 2, as shown in Fig. 4. Drive shaft 21 of motor M is caused to rotate forwards, 10 as during image read-processing.

When an attitude is established for cam 20, as shown in Fig. 4, the end face of cam 20 comes into contact with the other end of first arm 22. As a result, a position is established, for first arm 22, that is rotationally forward 15 of that shown in Fig. 3, in a clockwise direction, and first movable gear a_1 , which is provided at one end of the first arm, is thus disposed in a position at which engagement with driven gear G_1 does not take place. Consequently, contact of original-document platen roller P_1 with drive mechanism 2 is 20 broken, meaning that original-document platen roller P_1 does not rotate during print-processing. Meanwhile, as a result of coming into contact with one side face of cam 20, the other end of second arm 24 is established in a position that is rotationally forward of that shown in Fig. 3 in a clockwise 25 direction. As a result, second movable gear a_2 , which is provided at one end of second arm 24, is disposed so as to engage with driven gear G_2 . As a consequence of the forwards

rotation of drive shaft 21 of motor M, second movable gear a_2 rotates counterclockwise, transmitting rotational force to driven gear G_2 . This leads the recording-paper platen roller to rotate clockwise, thereby transporting recording paper K in a predetermined direction. Thereupon, as shown in Fig. 2, the plurality of heating elements 34 and plurality of drive ICs 35, of image read/write integrated head B, are utilized, and print-processing on recording paper K is thus achieved.

When image processing device A is to perform read-processing of an image on original document D and print-processing on recording paper K at the same time, an attitude is established for cam 20 of drive mechanism 2, as shown in Fig. 5, and drive shaft 21 of motor M is made to rotate forwards.

When such an attitude is established for cam 20, as shown in Fig. 5, first arm 22 and second arm 24 come into contact with side faces of cam 20. Since a position is established, for first arm 22, that is the same as that shown in Fig. 3, first movable gear a_1 is disposed in a position at which engagement with driven gear G_1 takes place. At the same time, since a position is established, for second arm 24, that is the same as that shown in Fig. 4, second movable gear a_2 is disposed in a position at which engagement with driven gear G_2 takes place. As a result, original-document platen roller P_1 and recording-paper platen roller P_2 rotate at the same time, thereby transporting original document D and recording

paper K in predetermined directions. Thereupon, as shown in Fig. 2, the plurality of light sources 32, lens array 39, plurality of photoreceptors 33, plurality of heating elements 34, and plurality of drive Is 35, of image read/write 5 integrated head B, are utilized, and read-processing of an image on original document D and print-processing of this image on recording paper K are achieved simultaneously.

Fig. 6 shows movement performed by drive mechanism 2 in order to change the attitude of cam 20 of drive mechanism 2 by causing 10 drive shaft 21 of motor M to rotate in reverse. When drive shaft 21 is caused to rotate in reverse, as shown by arrow N5, intermediate gear b_5 rotates clockwise. This causes first arm 22 to rotate clockwise about an axis formed by fixed shaft 23, and first movable gear a_1 , which is provided at one end 15 of first arm 22, is established in a position in which engagement with intermediate gear 27 takes place. As a result of first movable gear a_1 transmitting rotational force to intermediate gear 27, intermediate gear 27 and cam 20, which is fixed thereto, rotate clockwise, and the attitude of cam 20 is thus changed. At that time, first movable gear a_1 engages 20 only with intermediate gear b_5 and intermediate gear 27, and not with intermediate gear b_4 . Further, since intermediate gear 27 rotates independently of intermediate gear b_6 , cam 20 also rotates independently of intermediate gear b_6 , the 25 attitude of cam 20 being thus controlled. The other end of first arm 22 moves away from cam 20, meaning that the rotational movement of cam 20 is not impeded. Second arm 24

comes into contact with cam 20, but since contact is made such that the second arm receives, via a smooth side face thereof, a spring bias member that is on the cam, second arm 24 does not stop the rotation of cam 20 either. The angle of rotation 5 of cam 20 is matched to the angle of rotation of intermediate gear 27, and corresponds to the angle of rotation of drive shaft 21 of motor M. Consequently, by controlling the angle of rotation when the drive shaft 21 is caused to rotate in reverse, and by means of first movable gear a_1 , an attitude 10 for cam 20 can be easily established that is equal to any of the attitudes in Figs. 3 through 5 as discussed above. In order to precisely control the angle of rotation, a sensor may be provided for detecting the attitude of cam 20 (the phase thereof), thus making it possible to control the angle of 15 rotation of drive shaft 21 of motor M while detecting the actual attitude (phase) of cam 20 by using this sensor.

In the image processing device A of the present embodiment, first movable gear a_1 and second movable gear a_2 are provided, not in the middle of drive mechanism 2, but 20 instead at the end thereof, so as to be capable of engaging directly with original-document platen roller P_1 and recording-paper platen roller P_2 . With a constitution of this kind, it is possible to provide a drive mechanism 2 that is designed to be disposed between large-diameter intermediate 25 gear b_3 , first movable gear a_1 , and second movable gear a_2 . In concrete terms, in drive mechanism 2, a plurality of components, which serve to transmit motive power to

original-document platen roller P_1 and recording-paper platen roller P_2 when motor M is rotating forwards, also serve to displace first movable gear a_1 and second movable gear a_2 , simply by motor M rotating in reverse, and by the motive power 5 transmission function being halted. Also, since first movable gear a_1 and second movable gear a_2 are positioned at the end of the drive mechanism, the motive power transmission path of the drive mechanism is not obstructed at any point therealong as a result of the displacement of the two movable 10 gears. Consequently, substantially all the components of the drive mechanism are used in conjunction with one another in order to achieve the motive power transmission function and displacement function. In order to achieve a good level of efficiency for the motive power transmission function and the 15 displacement function, according to the present invention, there is no requirement to especially provide any components other than those serving to transmit motive power, or to provide a motor for driving such additional components. Further, on account of the provision of first movable gear 20 a_1 and second movable gear a_2 at the end of drive mechanism 2, gears, as required conventionally, between first movable gear a_1 and driven gear G_1 , and between second movable gear a_2 and driven gear G_2 , are no longer essential components. As a result, the total number of gears required by the image 25 processing device can be reduced, thus permitting a reduction in the manufacturing costs thereof.

Furthermore, in the image processing device A of the present embodiment, since the original-document platen roller P_1 and recording-paper platen roller P_2 are both arranged on the same side of base plate 31 of image read/write integrated head B, it is possible for these platen rollers to be disposed close to one another. In other words, the interval between the shafts of respective driven gears G_1 , G_2 thereof can be made short. As a result, the manufacture of a construction that permits the first movable gear a_1 and second movable gear a_2 of drive mechanism 2 to engage directly with driven gears G_1 , G_2 , is straightforward. Further, since the interval between the shafts of driven gears G_1 , G_2 is short, it is possible to also make short the interval between the shafts of first movable gear a_1 and second movable gear a_2 , whereby it becomes possible to make the overall size of drive mechanism 2 compact.

In the image processing device A of the present embodiment, by switching the rotation of drive shaft 21 of motor M to forward or reverse, the movements for the displacement of first movable gear a_1 and second movable gear a_2 , and the rotational movements of original-document platen roller P_1 and recording-paper platen roller P_2 may be performed individually. The drive mechanism 2 of the present embodiment is provided with a streamline constitution for achieving such movements. However, the actual constitution of drive mechanism 2 is not limited to this constitution. For example, a one-way clutch may be employed as a means for changing the

positions of the first movable gear and second movable gear through the reverse rotational movement of the motor drive shaft. When the drive mechanism comprises a one-way clutch of this kind, a constitution is possible such that rotational 5 force of the motor is transmitted to the cam only during reverse rotation of the drive shaft of the motor, it being possible to establish a suitable attitude for the cam by causing same to rotate through a desired angle.

In addition, the actual constitution of each of the 10 parts of the image processing device relating to the present invention can be modified according to a variety of designs. The image processing device according to the present invention need not necessarily be constituted in the form of a facsimile device provided with an image-conveyance function. 15 Further, the image processing device according to the present invention need not necessarily be provided with a function for copying original documents.

CLAIMS

(As Amended under PCT Article 34)

1. An image processing device, comprising:

5 an original-document platen roller that has a first driven gear and is for transporting an original document; a recording-paper platen roller that has a second driven gear and is for transporting recording paper; and

10 a drive mechanism that has a first movable gear, a second movable gear, and a drive source and is for transmitting a drive force generated by this drive source to the first driven gear and second driven gear;

15 wherein the first movable gear is provided so as to be capable of engaging directly with the first driven gear, and the second movable gear is provided so as to be capable of engaging directly with the second driven gear.

2. The image processing device according to claim 1, further comprising an image read/write integrated head, in which a plurality of photoreceptors for reading an original-document image, and a plurality of printing elements for performing image printing are mounted on a same side of a same base plate, and wherein said original-document platen roller is provided facing said plurality of photoreceptors, and said recording-paper platen roller is provided facing said plurality of printing elements.

3. The image processing device according to claim 1, wherein
said drive mechanism comprises a switching mechanism that
selectively causes said first movable gear and said second
movable gear to engage with said first driven gear and said
5 second driven gear.

4. The image processing device according to claim 3, wherein
said switching mechanism permits a mode in which said first
movable gear is caused to engage with said first driven gear,
10 and said second movable gear is simultaneously moved away from
said second driven gear.

5. The image processing device according to claim 3, wherein
said switching mechanism permits a mode in which said second
movable gear is caused to engage with said second driven gear,
15 and said first movable gear is simultaneously moved away from
said first driven gear.

6. The image processing device according to claim 3, wherein
20 said switching mechanism permits a mode in which said first
movable gear is caused to engage with said first driven gear,
and said second movable gear is simultaneously caused to
engage with said second driven gear.

25 7. The image processing device according to claim 3, wherein
said switching mechanism comprises a cam that has a cam gear
for receiving drive force from said drive source; a first arm

that is provided so as to be capable of coming into contact with said cam and on which said first movable gear is mounted; a second arm that is provided so as to be capable of coming into contact with said cam and on which said second movable gear is mounted, and wherein said cam establishes a position of said first movable gear and second movable gear through contact with said first arm and said second arm.

8. The image processing device according to claim 7, wherein said first arm is capable of swinging about an axis formed by a shaft portion, and has a first end portion, on which said first movable gear is provided, and a second end portion that is capable of coming into contact with said cam.

15 9. The image processing device according to claim 7, wherein said second arm is capable of swinging about an axis formed by a shaft portion, and has a first end portion, on which said second movable gear is provided, and a second end portion that is capable of coming into contact with said cam.

20

10. The image processing device according to claim 9, wherein the second end portion of the second arm remains in continual contact with said cam by means of spring bias.

25 11. The image processing device according to claim 7, wherein said drive source is a motor that has a drive shaft capable of forward and reverse rotation, and said switching mechanism

causes the cam to rotate, without transmitting drive force of said motor to said cam gear during forward rotation of said drive shaft, or transmitting said drive force to said cam gear during reverse rotation of said drive shaft.

5

12. The image processing device according to claim 11, wherein said first arm is capable of swinging about an axis formed by a shaft portion, and has a first end portion, on which said first movable gear is provided, and a second end portion that 10 is capable of coming into contact with said cam, and wherein, during reverse rotation of said drive shaft, contact, between said second end portion of said first arm, and said cam, is broken, said first movable gear swings until a position is established in which said first movable gear engages with said 15 cam gear, and said drive force is transmitted to said cam gear.

13. (Deleted)

ABSTRACT

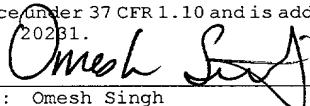
The image processing device (A) comprises an original-document platen roller (P₁) that has a first driven gear (G₁) and is for transporting an original document (D), 5 a recording-paper platen roller (P₂) that has a second driven gear (G₂) and is for transporting recording paper (K), and a drive mechanism (2) that has a first movable gear (a₁), a second movable gear (a₂), and a drive source (M) and is for 10 transmitting a drive force generated by this drive source (M) to the first driven gear (G₁) and second driven gear (G₂). First movable gear (a₁) is provided so as to be capable of engaging directly with first driven gear (G₁), and second 15 movable gear (a₂) is provided so as to be capable of engaging directly with second driven gear (G₂).

CERTIFICATE UNDER 37 CFR 1.10

'Express Mail' mailing label number: EL669945426US

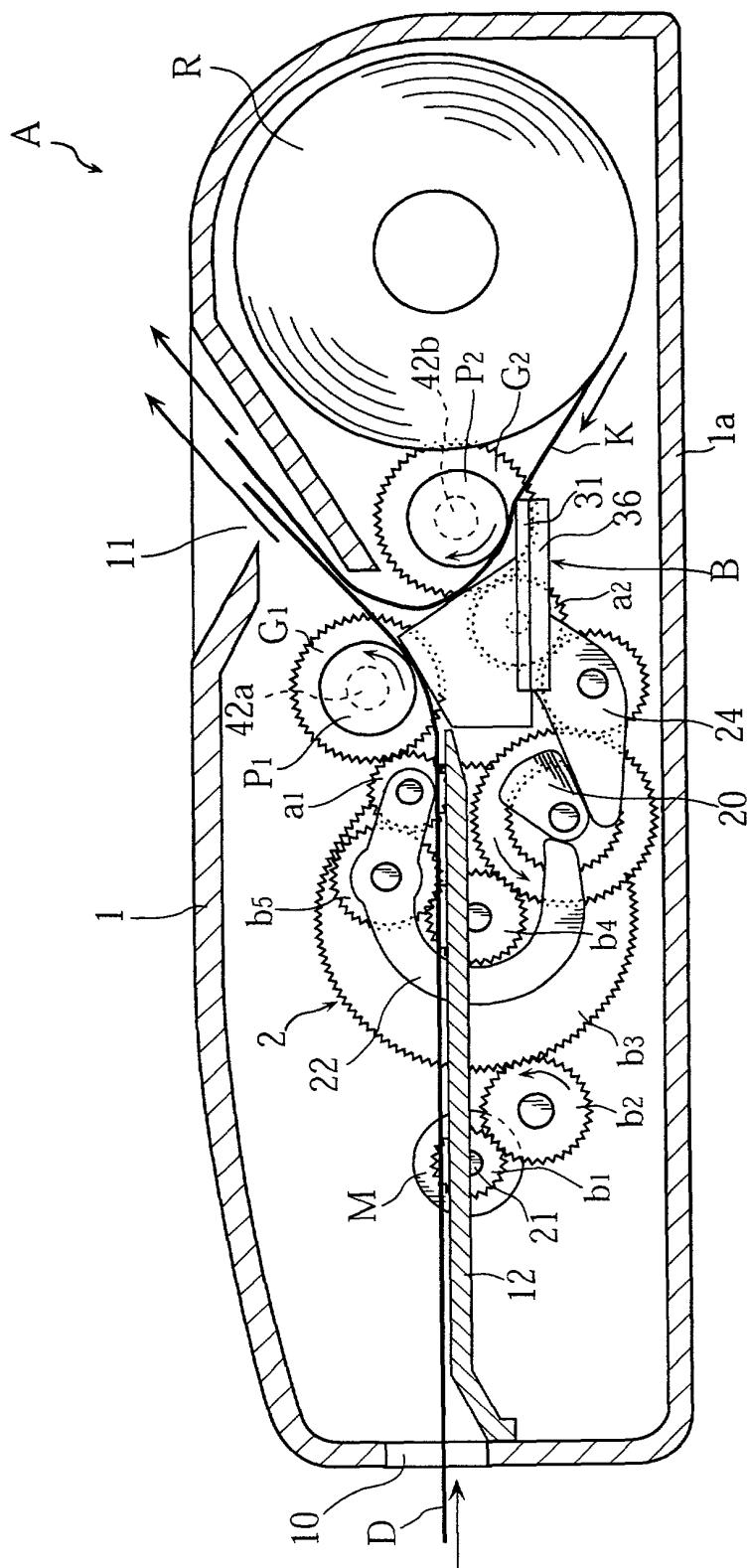
Date of Deposit: August 3, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 and is addressed to the Commissioner for Patents, Washington, D.C. 20231.

By: 
Name: Omesh Singh

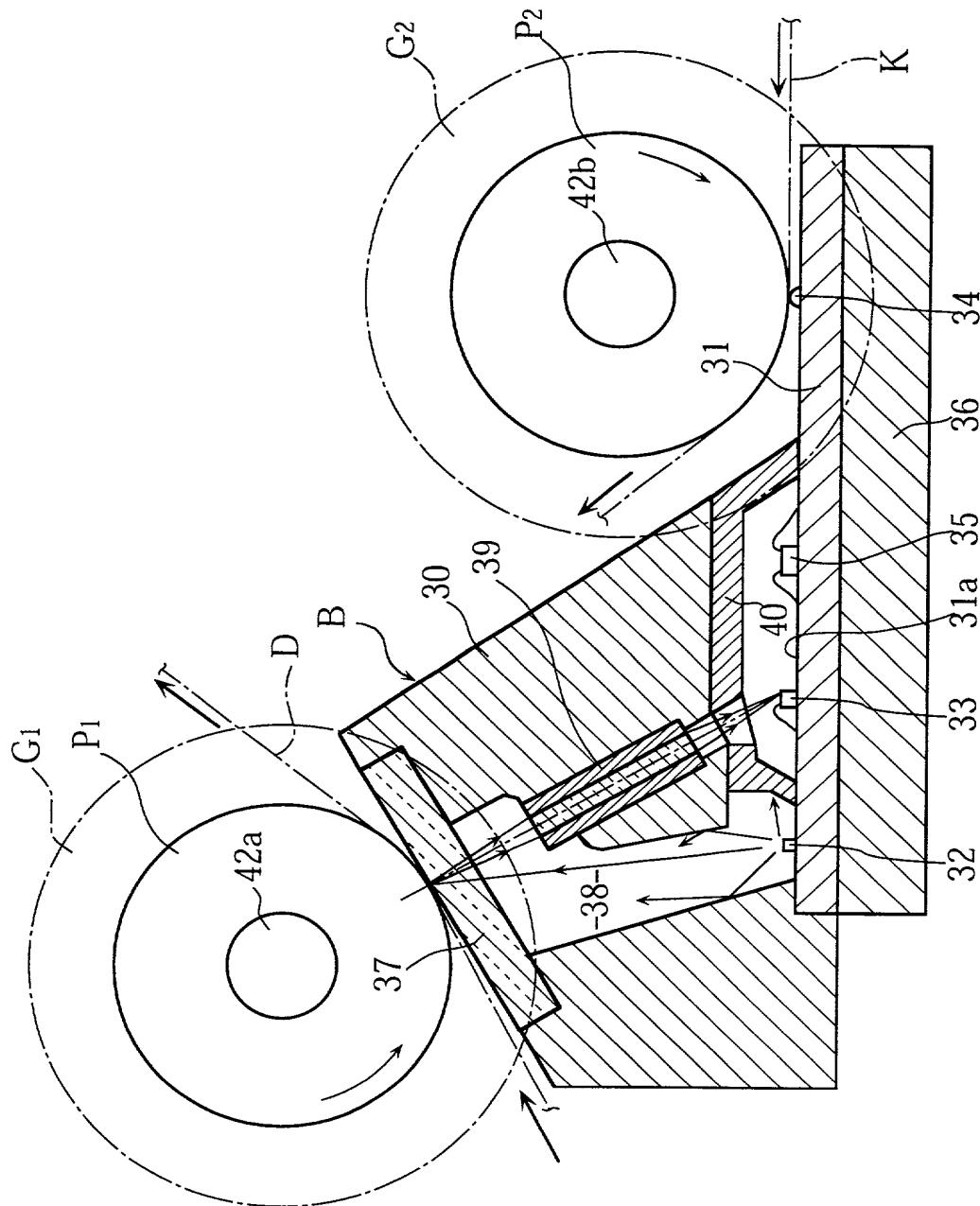
09/890634

FIG. 1



09/890634

FIG.2



09/890634

FIG.3

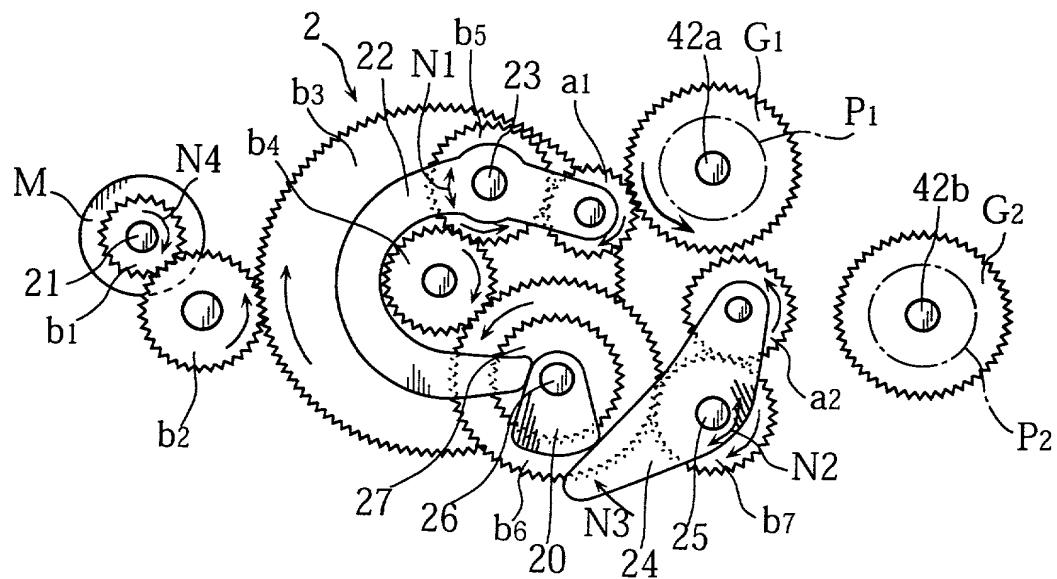


FIG.4

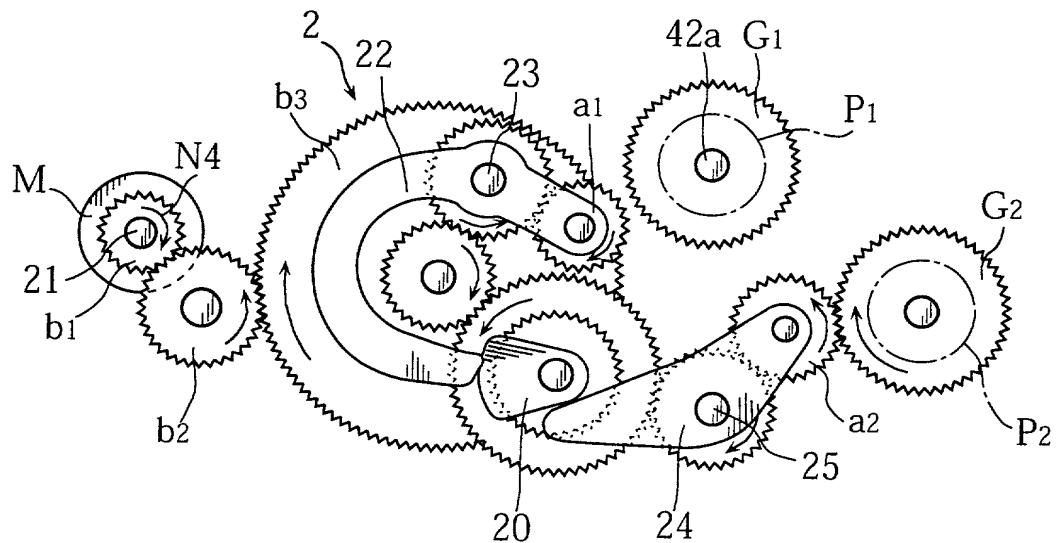


FIG.5

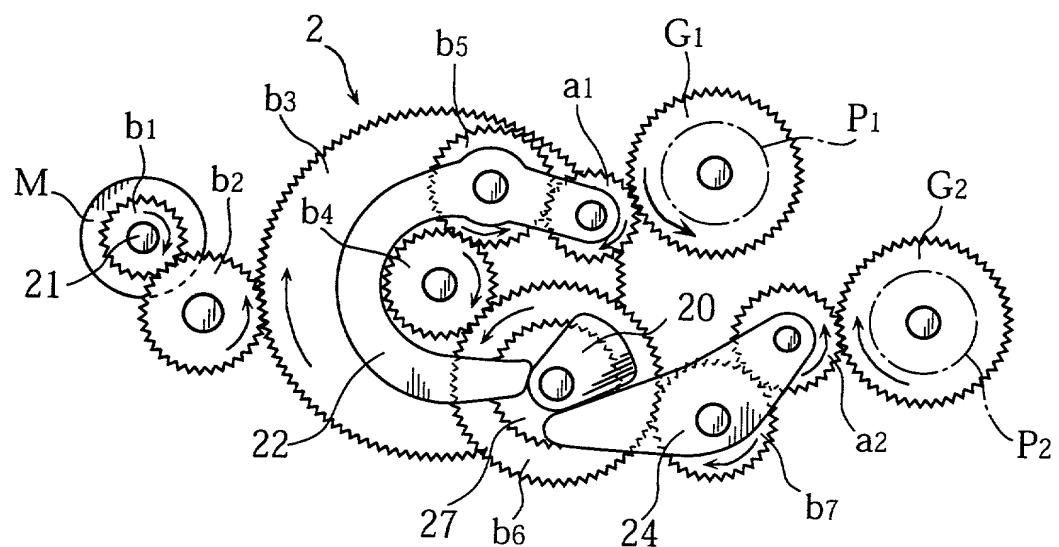
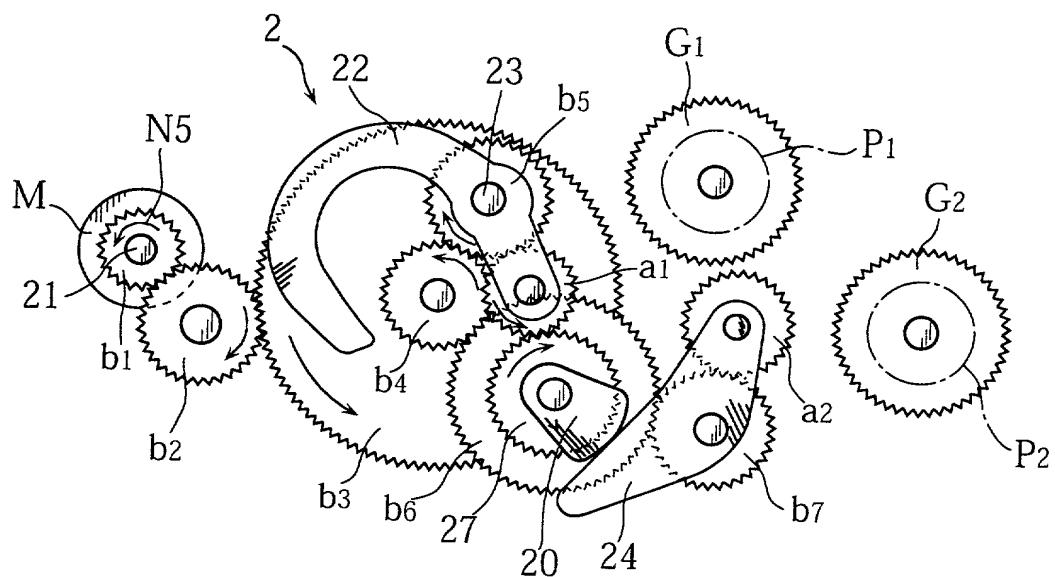
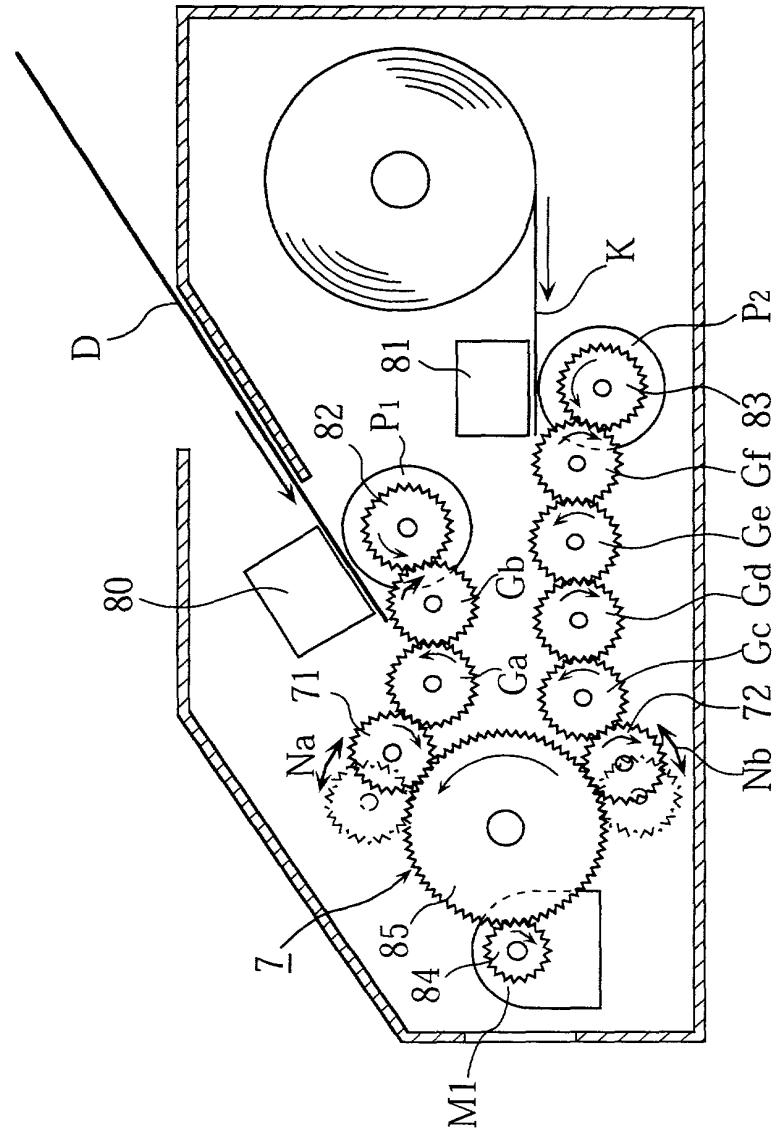


FIG.6



09/890634

FIG.7
PRIOR ART



Declaration and Power of Attorney For Patent Application

特許出願宣言書

Japanese Language Declaration

私は、下欄に氏名を記載した発明者として、以下のとおり宣言する：

As a below named inventor, I hereby declare that:

私の住所、郵便の宛先および国籍は、下欄に氏名に統いて記載したとおりであり、

My residence, post office address and citizenship are as stated below next to my name,

名称の発明に関し、請求の範囲に記載した特許を求める
主題の本来の、最初にして唯一の発明者である（一人の
氏名のみが下欄に記載されている場合）か、もしくは本
來の、最初にして共同の発明者である（複数の氏名が下
欄に記載されている場合）と信じ、

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

IMAGE PROCESSING DEVICE

その明細書を
(該当する方に印を付す)

the specification of which
(check one)

is attached hereto.

ここに添付する。

was filed on _____ as

第 _____ 号として提出し、

Application Serial No. _____

日に補正した。

and was amended on _____

(該当する場合)

(if applicable)

日にPCT国際出願番号
第 _____ 号として提し、
PCT第19条に基づき _____ 日に補正た。
(該当する場合)

was described and claimed in PCT international application

No. PCT/JP00/00635 filed on

February 4, 2000

and as amended under PCT Article 19 or 34 on
October 8, 2000

(if applicable)

私は、前記のとおり補正した請求の範囲を含む前記明細書の内容を検討し、理解したことを陳述する。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37部第1章第56条 (a) 項に従い、
本願の審査に所要の情報を開示すべき義務を有すること
を認める。

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

Japanese Language Declaration

私は、合衆国法典第35部第119条 (a) - (d) 項または第365条 (a) - (b) 項にもとづく下記の外国特許出願または発明者証出願または少なくとも1つの合衆国以外の国を指定したPCT国際出願の外国優先権利益を主張し、さらに優先権の主張に係わる基礎出願の出願日前の出願日を有する外国特許出願または発明者証出願またはPCT国際出願を以下に明記する：

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) or § 365(a)-(b) of any foreign application(s) for patent or inventor's certificate, or of any PCT international application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate or PCT international application having a filing date before that of the application on which priority is claimed:

Prior foreign applications

先の外国出願

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)	Priority claimed 優先権の主張
Patent Application No. 11-35720	Japan	15/2/1999	<input checked="" type="checkbox"/> Yes あり <input type="checkbox"/> No なし
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)	<input type="checkbox"/> Yes あり <input type="checkbox"/> No なし
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)	<input type="checkbox"/> Yes あり <input type="checkbox"/> No なし
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)	<input type="checkbox"/> Yes あり <input type="checkbox"/> No なし
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願の年月日)	<input type="checkbox"/> Yes あり <input type="checkbox"/> No なし

私は、合衆国法典第35部第120条にもとづく下記の合衆国特許出願の利益または第365条 (c) 項にもとづく合衆国を指定するPCT国際出願の利益を主張し、本願の請求の範囲各項に記載の主題が合衆国法典第35部112条第1項に規定の様で先の合衆国出願に開示されていない限りにおいて、先の出願の出願日と本願の国内出願日またはPCT国際出願日の間に公表された連邦規則法典第37部第1章第56条 (a) 項に記載の所要の情報を開示すべき義務を有することを認める：

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing Date) (現況) (Status)
(出願番号) (出願日) (特許済み、係属中、放棄済み) (patented, pending, abandoned)

(Application Serial No.) (Filing Date) (現況) (Status)
(出願番号) (出願日) (特許済み、係属中、放棄済み) (patented, pending, abandoned)

Japanese Language Declaration

私は、ここに自己の知識にもとづいて行った陳述がすべて真実であり、自己の有する情報および信ずるところに従って行った陳述が真実であると信じ、さらに故意に虚偽の陳述等を行った場合、合衆国法典第18部第1001条により、罰金もしくは禁固に処せられるか、またはこれらの刑が併科され、またかかる故意による虚偽の陳述が本願ないし本願に対して付与される特許の有効性を損なうことがあることを認識して、以上の陳述を行ったことを宣言する。

委任状：私は、下記発明者として、以下の代理人をここに選任し、本願の手続を遂行すること並びにこれに関する一切の行為を特許商標庁に対して行うことを委任する。
(代理人氏名および登録番号を明記のこと)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and /or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.(list name and registration number)

Albrecht, John W. Ali, M. Jeffer Anderson, Gregg I. Batzli, Brian H. Beard, John L. Bems, John M. Black, Bruce E. Branch, John W. Bremer, Dennis C. Bruess, Steven C. Byrne, Linda M. Campbell, Keith Carlson, Alan G. Caspers, Philip P. Chiapetta, James R. Clifford, John A. Daignault, Ronald A. Daley, Dennis R. Dalglish, Leslie E. Daulton, Julie R. DeVries Smith, Kate DiPietro, Mark J. Edell, Robert T. Epp Ryan, Sandra Glance, Robert J. Goggin, Matthew J. Goila, Charles E. Gorman, Alan G. Gould, John D. Gregson, Richard Gresens, John J. Hamer, Samuel A.	Reg. No. 40,481 Reg. No. 46,359 Reg. No. 28,828 Reg. No. 32,960 Reg. No. 27,612 Reg. No. 43,496 Reg. No. 41,622 Reg. No. 41,633 Reg. No. 40,528 Reg. No. 34,130 Reg. No. 32,404 Reg. No. P-46,597 Reg. No. 25,959 Reg. No. 33,227 Reg. No. 39,634 Reg. No. 30,247 Reg. No. 25,968 Reg. No. 34,994 Reg. No. 40,579 Reg. No. 36,414 Reg. No. 42,157 Reg. No. 28,707 Reg. No. 20,187 Reg. No. 39,667 Reg. No. 40,620 Reg. No. 44,125 Reg. No. 26,896 Reg. No. 38,472 Reg. No. 18,223 Reg. No. 41,804 Reg. No. 33,112 Reg. No. P-46,754	Hamre, Cutus B. Harrison, Kevin C. Hertzberg, Brett A. Hillson, Randall A. Holzer, Jr., Richard J. Johnston, Scott W. Kadievitch, Natalie D. Karjeker, Shaukat Kastelic, Joseph M. Kettelberger, Denise Keys, Jeramie J. Knearl, Homer L. Kowalchyk, Alan W. Kowalchyk, Katherine M. Lacy, Paul A. Larson, James A. Leon, Andrew J. Leonard, Christopher J. Liepa, Mara E. Lindquist, Timothy A. Lycke, Lawrence E. McDonald, Daniel W. McIntyre, Jr. William F. Mitchem, M. Todd Mueller, Douglas P. Nichols, A. Shane Pauly, Daniel M. Phillips, Bryan K. Phillips, John B. Plunkett, Theodore Prendergast, Paul Pytel, Melissa J.	Reg. No. 29,165 Reg. No. P-46,759 Reg. No. 42,660 Reg. No. 31,838 Reg. No. 42,668 Reg. No. 39,721 Reg. No. 34,196 Reg. No. 34,049 Reg. No. 37,160 Reg. No. 33,924 Reg. No. 42,724 Reg. No. 21,197 Reg. No. 31,535 Reg. No. 36,848 Reg. No. 38,946 Reg. No. 40,443 Reg. No. P-46,869 Reg. No. 41,940 Reg. No. 40,066 Reg. No. 40,701 Reg. No. 38,540 Reg. No. 32,044 Reg. No. 44,921 Reg. No. 40,731 Reg. No. 30,300 Reg. No. 43,836 Reg. No. 40,123 Reg. No. P-46,990 Reg. No. 37,206 Reg. No. 37,209 Reg. No. 46,068 Reg. No. 37,209	Qualey, Terry Reich, John C. Reiland, Earl D. Samuels, Lisa A. Schmitz, David G. Schuman, Mark D. Schumann, Michael D. Scull, Timothy B. Sebald, Gregory A. Skoog, Mark T. Spellman, Steven J. Stoll-DeBell, Kirsten L. Sumner, John P. Swenson, Erik G. Tellekson, David K. Trembath, Jon R. Tuchman, Ido Underhill, Albert L. Vandenburg, J. Derek Wahl, John R. Weaver, Karrie G. Weller, Paul A. Whipps, Brian Whitaker, John E. Wickham, J. Scot Williams, Douglas J. Withers, James D. Wiu, Jonelle Wu, Tong Xu, Min S. Zeuli, Anthony R.	Reg. No. 25,148 Reg. No. 37,703 Reg. No. 25,767 Reg. No. 43,080 Reg. No. 39,828 Reg. No. 31,197 Reg. No. 30,422 Reg. No. 42,137 Reg. No. 33,280 Reg. No. 40,178 Reg. No. 45,124 Reg. No. 43,164 Reg. No. 29,114 Reg. No. 45,147 Reg. No. 32,314 Reg. No. 38,344 Reg. No. 45,924 Reg. No. 27,403 Reg. No. 32,179 Reg. No. 33,044 Reg. No. 43,245 Reg. No. 20,890 Reg. No. 43,261 Reg. No. 33,044 Reg. No. 41,376 Reg. No. 27,054 Reg. No. 40,376 Reg. No. 41,980 Reg. No. 43,361 Reg. No. 39,536 Reg. No. 45,255
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書類の送付先：

Douglas P. Mueller
MERCHANT & GOULD P.C.
3200 IDS Center, 80 South 8th Street,
Minneapolis, MN 55402-2215, U.S.A.

Send Correspondence to:

Douglas P. Mueller
MERCHANT & GOULD P.C.
3200 IDS Center, 80 South 8th Street,
Minneapolis, MN 55402-2215, U.S.A.

Customer No. 22552

直通電話連絡先：(電話番号)

Douglas P. Mueller at 612/371-5237

Direct Telephone Calls to: (telephone number)

Douglas P. Mueller at 612/371-5237

Japanese Language Declaration

唯一のまたは第一の発明者の氏名 1 - ○○	Full name of sole or first inventor <u>Hiroaki Onishi</u>
同発明者の署名 日付	Inventor's signature <u>Hiroaki Onishi</u> Date July 26, 2001
住所	Residence c/o ROHM CO., LTD. <u>Kyoto, Japan</u> JPX
国籍	Citizenship <u>Japan</u>
郵便の宛先	Post Office Address c/o ROHM CO., LTD. 21, Sain Mizosaki-cho, Ukyo-ku, Kyoto-shi, Kyoto 615-8585 Japan
第 2 の共同発明者の氏名 (該当する場合) 2 - ○○	Full name of second joint inventor, if any <u>Hisayoshi Fujimoto</u>
同第 2 発明者の署名 日付	Second Inventor's signature <u>Hisayoshi Fujimoto</u> Date July 26, 2001
住所	Residence c/o ROHM CO., LTD. <u>Kyoto, Japan</u> JPX
国籍	Citizenship <u>Japan</u>
郵便の宛先	Post Office Address c/o ROHM CO., LTD. 21, Sain Mizosaki-cho, Ukyo-ku, Kyoto-shi, Kyoto 615-8585 Japan
第 3 の共同発明者の氏名 (該当する場合)	Full name of third joint inventor, if any
同第 3 発明者の署名 日付	Third Inventor's signature Date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address
第 4 の共同発明者の氏名 (該当する場合)	Full name of fourth joint inventor, if any
同第 4 発明者の署名 日付	Fourth Inventor's signature Date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address
第 5 の共同発明者の氏名 (該当する場合)	Full name of fifth joint inventor, if any
同第 5 発明者の署名 日付	Fifth Inventor's signature Date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address